A comparison of FV3 and GFS forecasts within the Model Evaluation for Research Innovation Transition (MERIT) project

Jeff Beck[1], Michelle Harrold[3], Isidora Jankov[1], Jamie Wolff[3], Gerard Ketefian[2], Tracy Hertneky[3], and Christopher Williams[3]

[1]Cooperative Institute for Research in the Atmosphere (CIRA) at NOAA/ESRL/GSD, and Developmental Testbed Center (DTC)

[2]Cooperative Institute for Research in Environmental Sciences (CIRES) at NOAA/ESRL/GSD, and Developmental Testbed Center (DTC)

[3]National Center for Atmospheric Research (NCAR) and Developmental Testbed Center (DTC)

The goal of the Model Evaluation for Research Innovation Transition (MERIT) project established within the Developmental Testbed Center (DTC) is to foster an environment of active model development and testing, providing a framework for researchers and operational centers to evaluate selected meteorological cases for different operational models. Findings from these comparisons can then be used by the research community to help drive innovations with the ultimate goal of improving operational NWP, encouraging community development, and providing effective infrastructure for R2O and O2R.

With these goals in mind, and with the Finite-Volume Cubed-Sphere (FV3) model being selected as the dynamic core for the Next Generation Global Prediction System (NGGPS), the DTC developed an end-to-end workflow, including post-processing, visualization, and verification, to compare three select cases between the FV3 and the GFS at quarter-degree resolution. The three cases were part of the initial FV3 public release and were from 29 September 2016 (Hurricane Matthew), 18 January 2016 (East Coast blizzard), and 12 August 2016 (Louisiana flooding). The end-to-end workflow was run for each model with seven-day forecasts being compared through the use of Python plotting utilities and the Model Evaluation Tools (MET) verification suite.

Comparisons between the forecasts from GFS and FV3 will be presented, including quantitative verification of surface and upper-air temperature, relative humidity, and wind speed, in addition to precipitation as a function of forecast lead time and threshold. Qualitative comparison of features specific to each case will also be shown, such as track forecasts for Hurricane Matthew and the East Coast blizzard, and the location of maximum precipitation accumulation for the Louisiana flooding case.